



# Diazinon and Pesticide-Related Toxicity in Bay Area Urban Creeks

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Water Quality Attainment Strategy and  
Total Maximum Daily Load (TMDL)

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# Two Projects — One Report

- Water Quality Attainment Strategy for pesticide-related toxicity in urban creeks
- Total Maximum Daily Load (TMDL) for diazinon in urban creeks



# Report Organization

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- Summary
  - Problem Statement
  - TMDL Analyses
  - Implementation Plan
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- Introduction
- Water Quality Conditions
- Pesticide Use Trends
- Regulatory Oversight
- Project Description

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- Summary
- Problem Statement
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- Implementation Plan

- **Source Assessment**
  - **Numeric Targets**
  - **Linkage Analysis**
  - **Allocations**
-

# Report Organization

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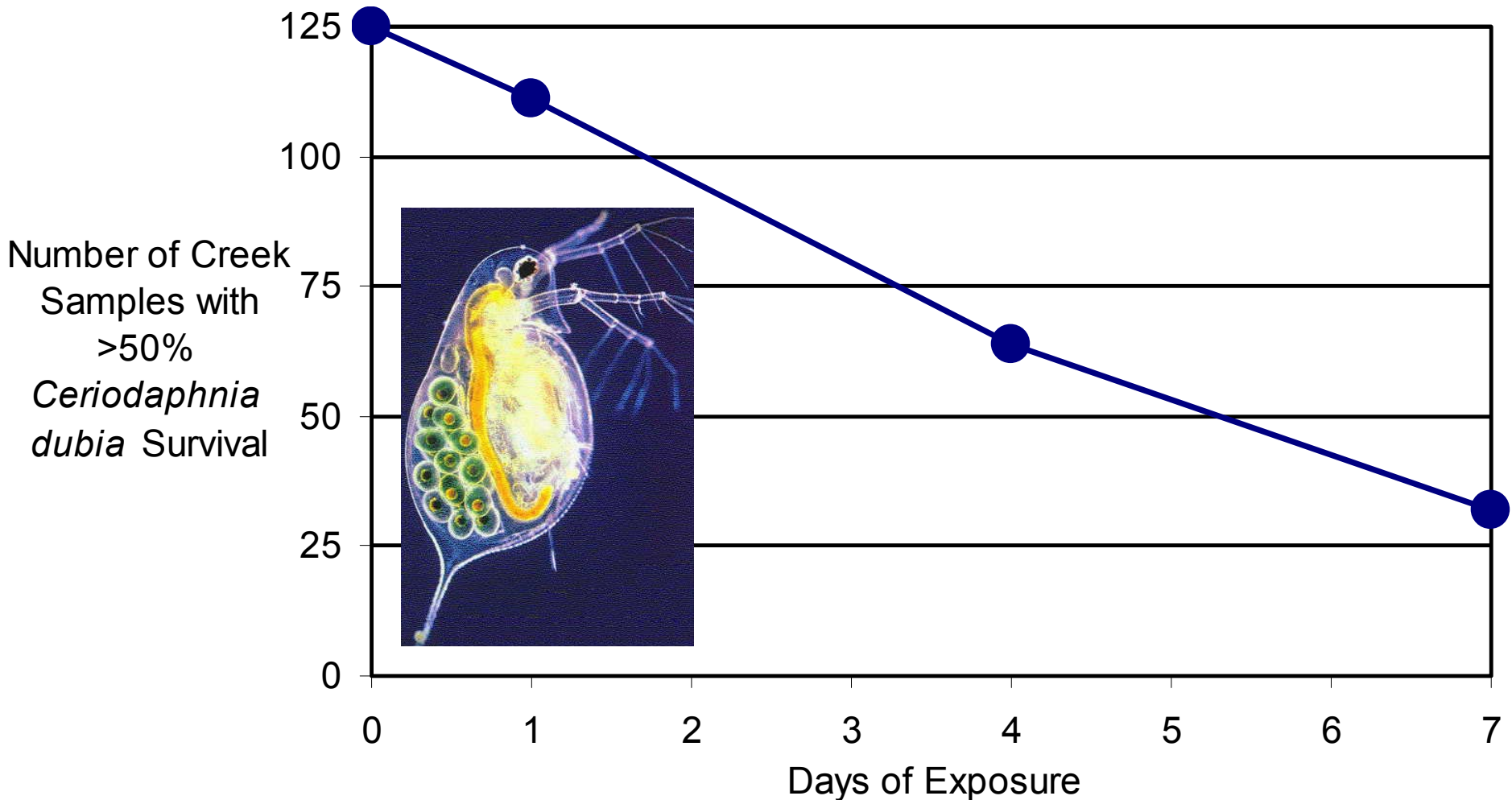
- Summary
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  - **Strategy and Proposed Actions**
  - **Monitoring and Adaptive Management**
  - **Early Implementation**

# ① Problem Statement

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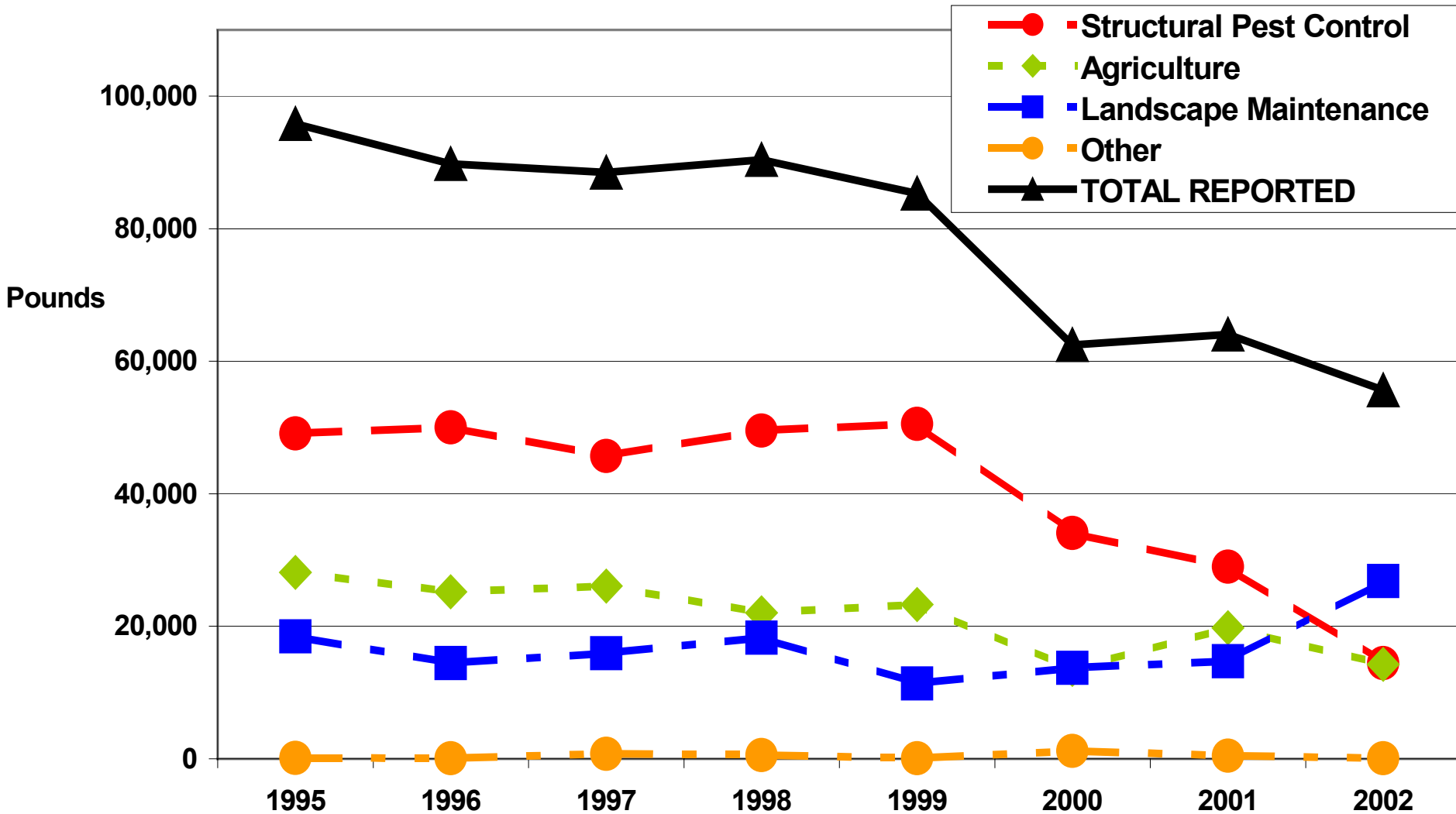
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# In 1990s, Urban Creek Toxicity Was Attributed to Diazinon

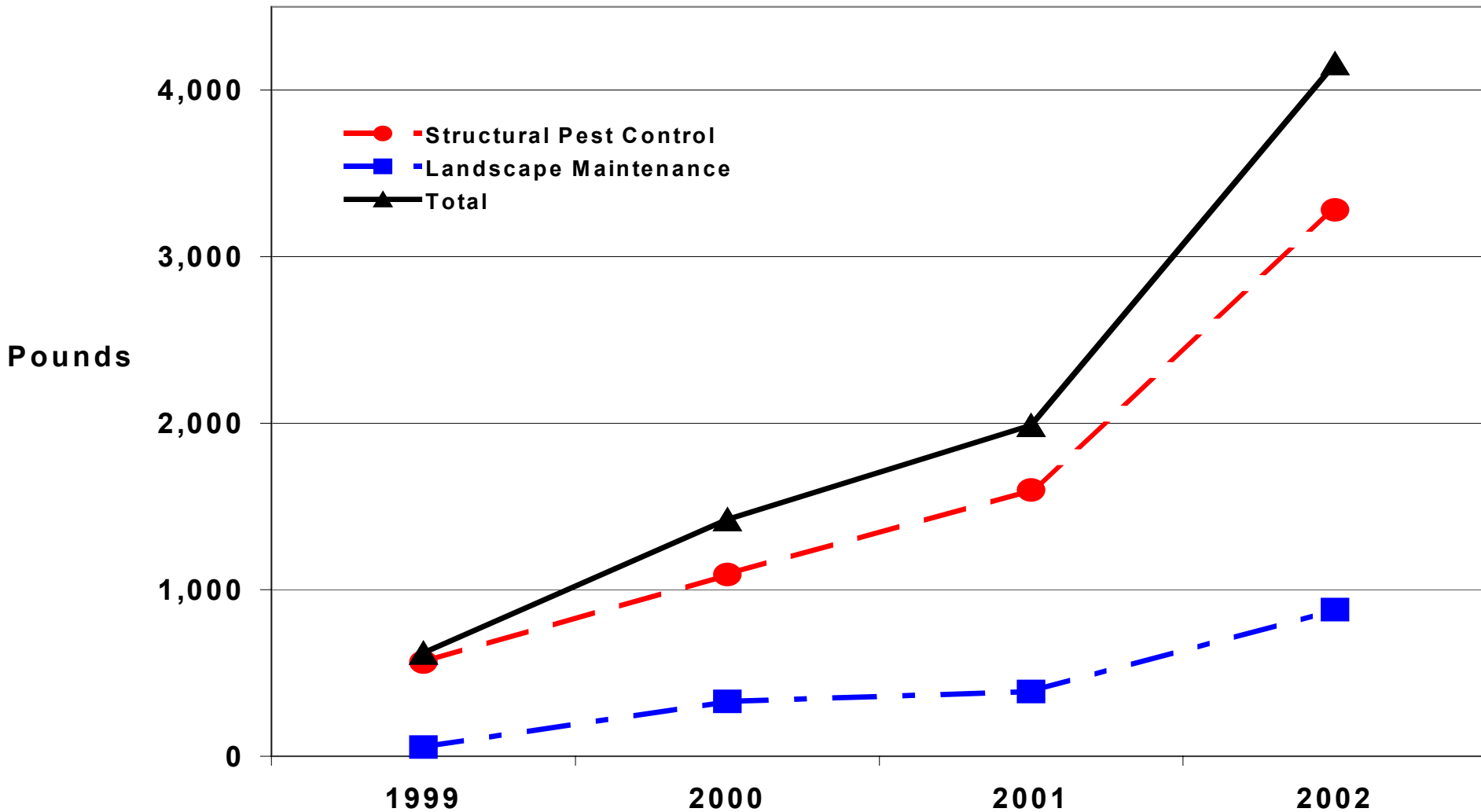




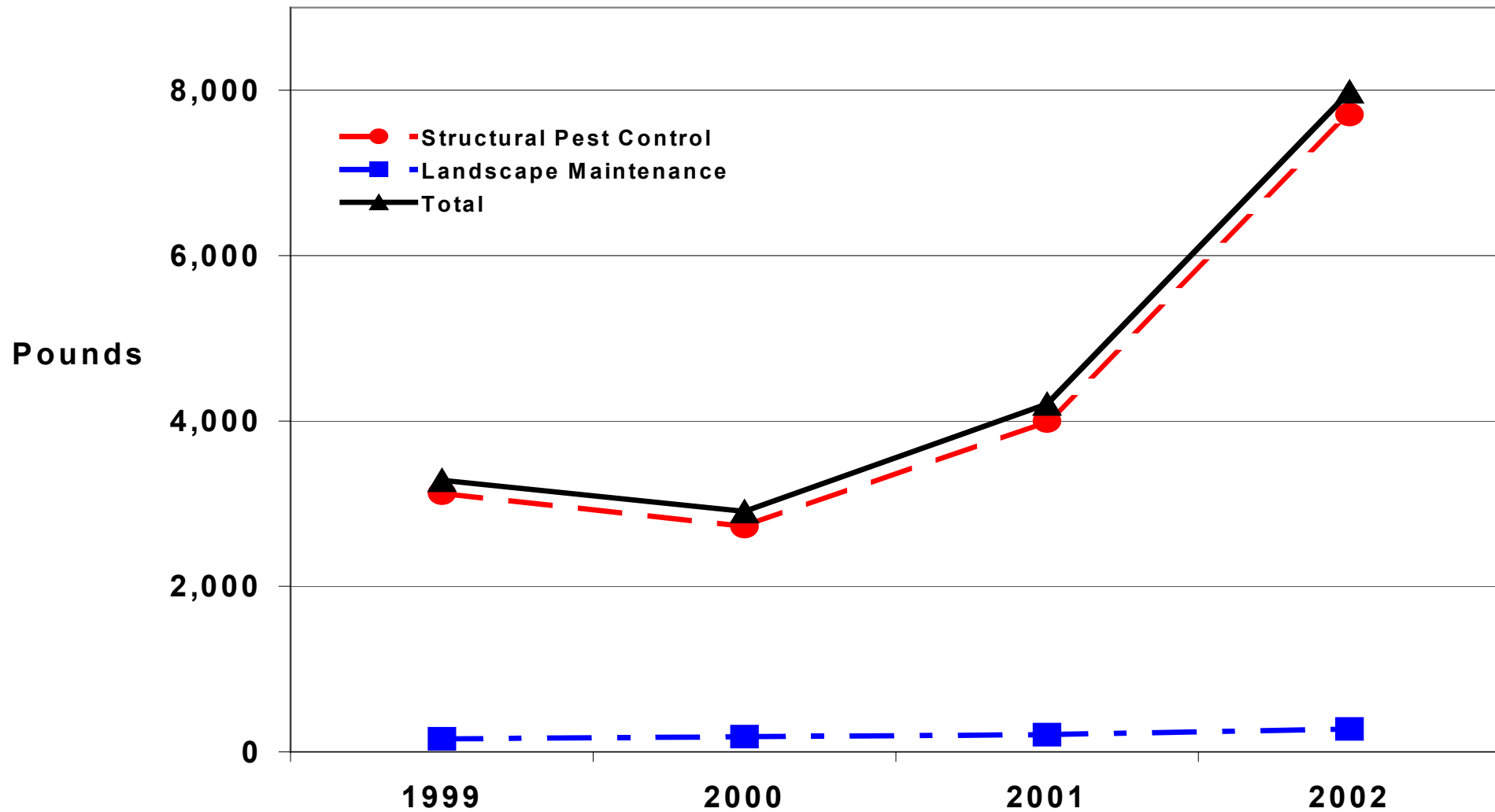
# Diazinon Use Is Declining



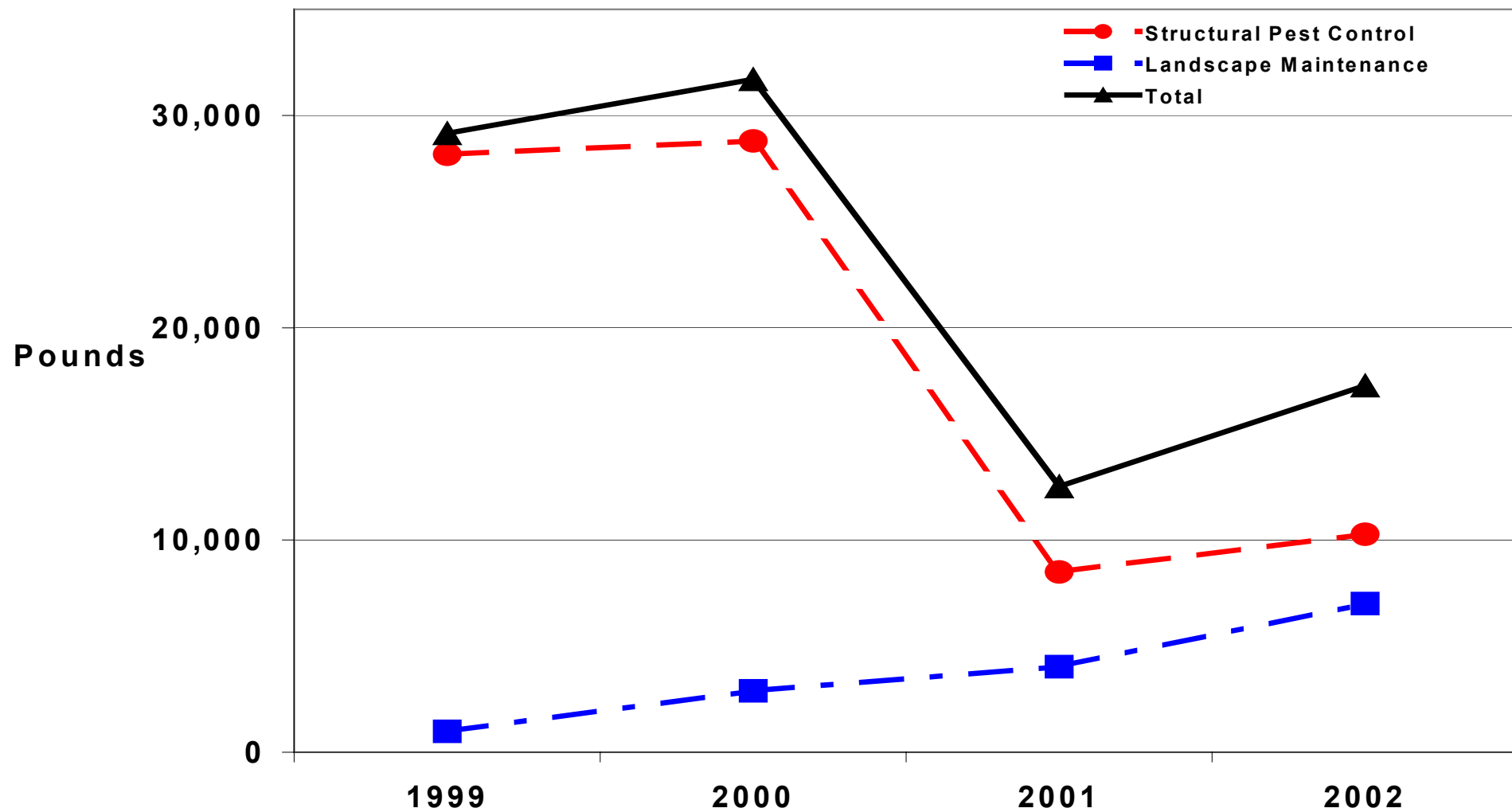
# Bifenthrin Use is Increasing



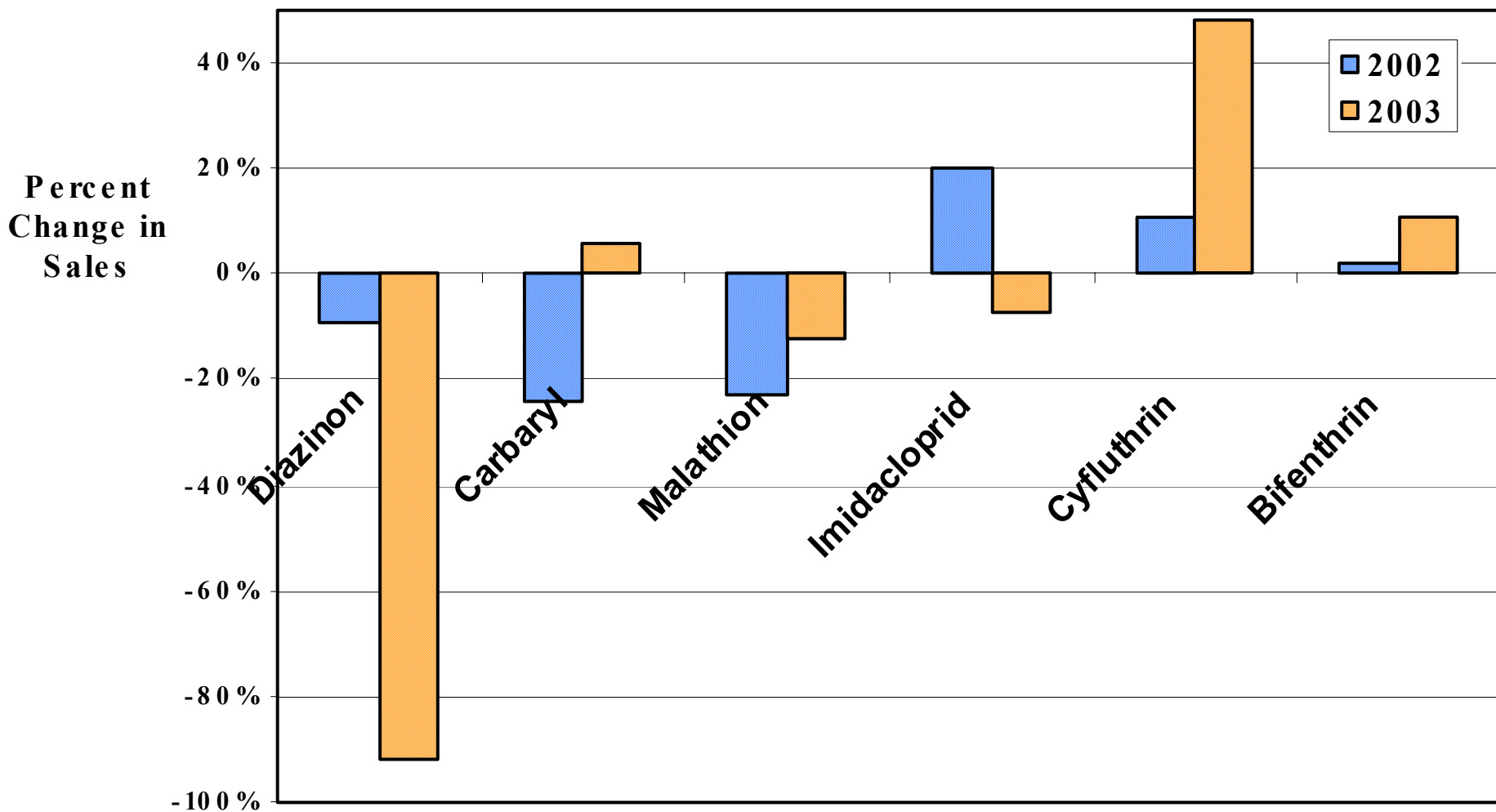
# Cyfluthrin Use Is Increasing



# Landscaping-Related Permethrin Use Is Increasing

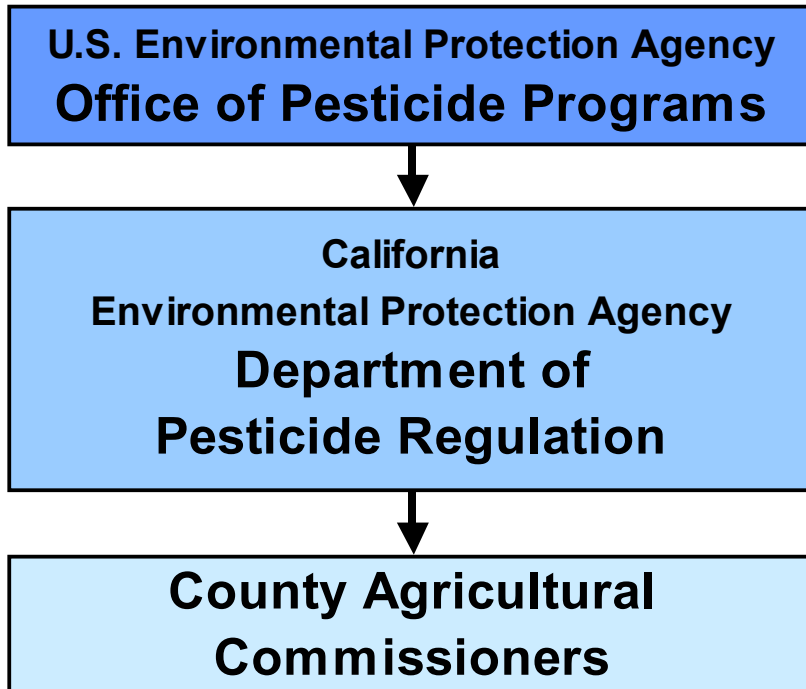


# Over-the-Counter Pesticide Sales Are Changing



# Regulatory Gaps Allow Pesticide Use that Threatens Water Quality

## Pesticide Regulators



## Water Quality Regulators



Federal

State

Local

# Risk Assessment Methods Differ

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## ■ U.S. EPA

Office of Water  
methods:

- More data sources
- More species
- More protective

## ■ U.S. EPA

Office of Pesticide  
Programs methods:

- Fewer data sources
  - Fewer species
  - Less protective
-

# Pesticide Registration Analysis Is Insufficient

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- Urban applications sites ignored.
  - Ecological endpoints differ (e.g., sediment ignored).
  - Cumulative ecological effects of mixtures ignored.
  - Effects of formulations ignored.
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# Important Data Not Collected

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- Data needed to derive water quality criteria not collected.
  - Commercially viable chemical analysis methods capable of detecting environmentally meaningful concentrations not required.
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# The Problem:

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- Diazinon is formally recognized as cause of toxicity in 37 urban creeks.
- All other urban creeks are also likely affected.
- New pesticide problems are likely as diazinon is phased out.

**Basin Plan Amendment to include a strategy for pesticide-related toxicity that includes a TMDL for diazinon.**

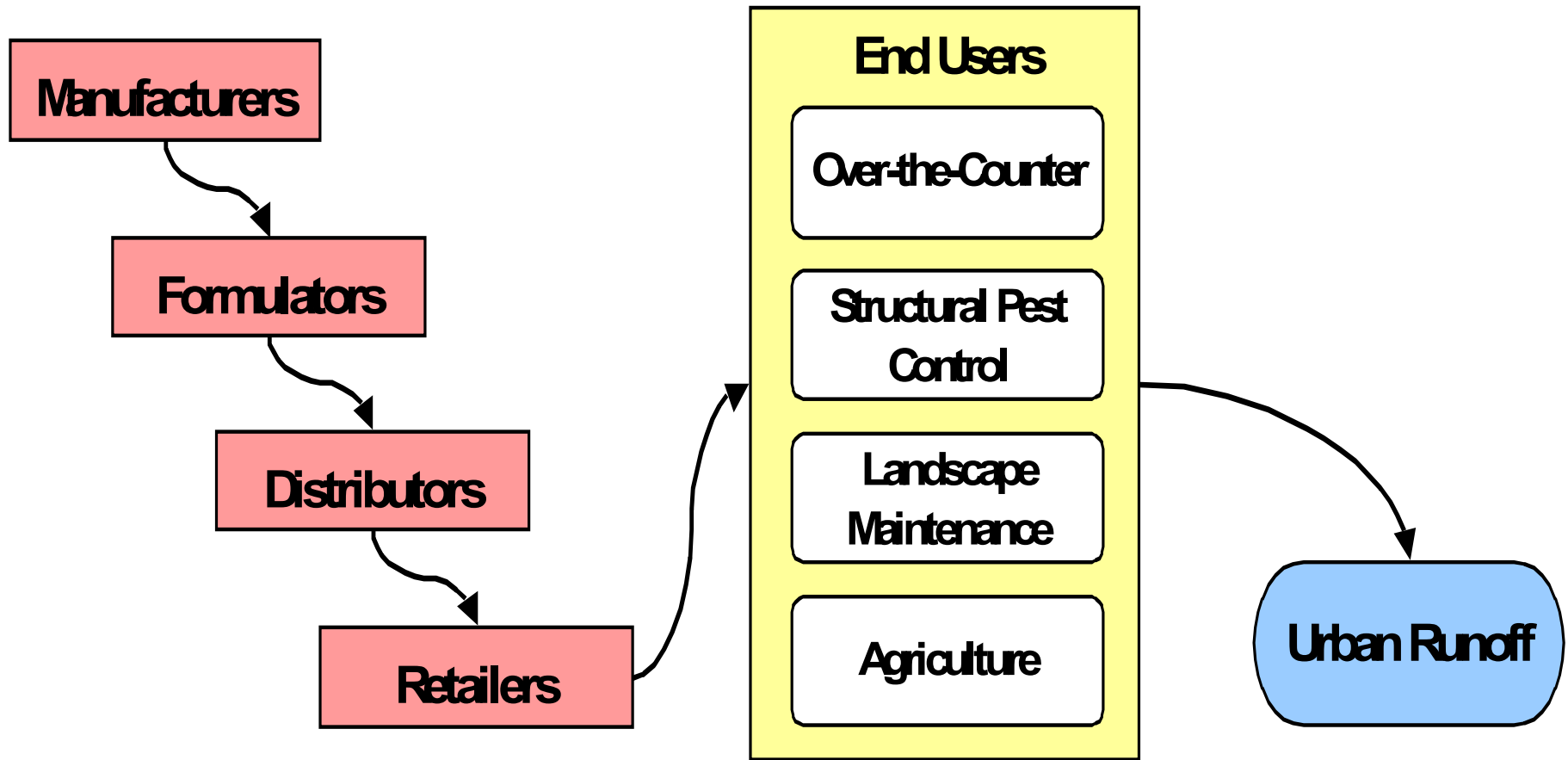
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## ② TMDL Analyses

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- Source Assessment
  - Numeric Targets
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-

# Storm Drains Are the Source of Pesticides in Urban Runoff



# Various Factors Contribute to Runoff

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- Quantities sold
  - Lack of residential oversight
  - Applications to paved surfaces
  - Applications of wettable powders and emulsifiable concentrates
  - Applications for ant control
  - Potential for inappropriate handling
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# Numeric Targets for Pesticide-Related Toxicity

*“All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms....”*

- $TU_a = 100\% / NOAEC = 1$
- $TU_c = 100\% / NOEC = 1$

(no significant toxicity in laboratory tests)

# Practical Considerations

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- Toxicity identification evaluations may be necessary if targets exceeded
  - If toxicity is related to pesticides  
⇒ implementation actions apply
  - If toxicity is NOT related to pesticides  
⇒ toxicity is beyond the scope of strategy
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# Diazinon Targets: Department of Fish and Game Criteria

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## ■ Acute Effects

- 80 ng/l (ppt)
- 1-hour average

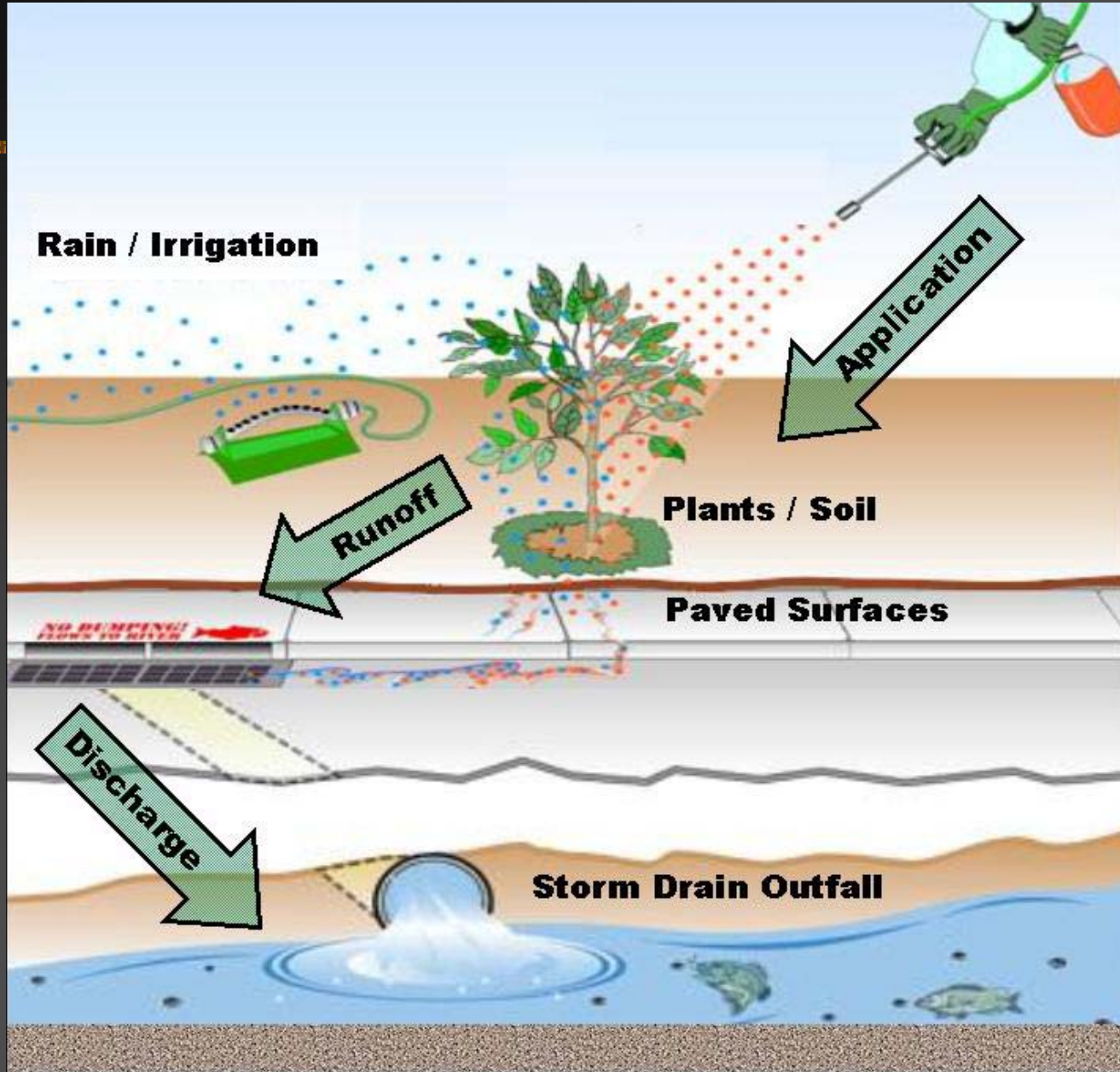
## ■ Chronic Effects

- 50 ng/l (ppt)
- 4-day average

- Not to be exceeded more than once every three years
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# Conceptual Model Shows Links



# Urban Runoff Sources Get Allocations

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- Countywide programs and co-permittees (phase I)
    - Alameda / Contra Costa / San Mateo / Santa Clara
  - Citywide permittees (phase I)
    - American Canyon / Vallejo / Fairfield / Suisun City
  - Statewide permittees (phase II)
    - All others
  - Caltrans, construction, and industrial permittees
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# Concentration-Based Targets Simplify Allocation Scheme

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Numeric Targets =

TMDL =

Wasteload Allocations

**No Allocation = No Permit to Discharge**

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# Margin of Safety Is Implicit

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- Analysis is subject to little uncertainty
  - Targets are conservative
  - Implementation will be adaptive
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# ③ Implementation Plan

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- Strategy and Proposed Actions
  - Monitoring and Adaptive Management
  - Early Implementation
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# Strategy Focuses on Three Goals

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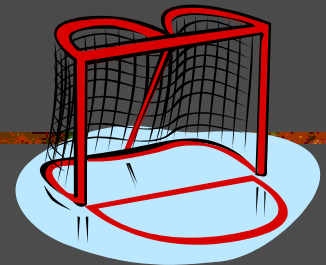
1. Better integrate pesticide and water quality regulation
  2. Reduce use of pesticides that threaten water quality
  3. Demonstrate successful implementation
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# Goal 1:

## Better Integrate Regulation

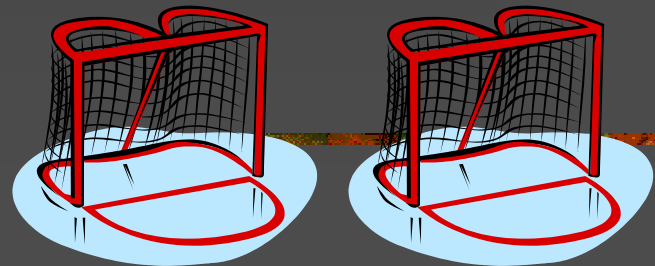
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- Regulate pesticides to comply with both pesticide and water quality laws.
- Ensure pesticide discharges do not exceed water quality objectives.



# Goal 2: Reach Out and Educate to Reduce Water Quality Risks

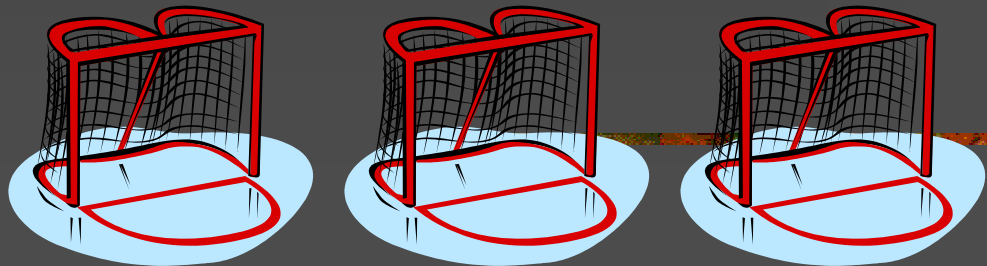
- Minimize public and private reliance on conventional toxic pesticides.
- Adopt least toxic pest management practices (i.e., Integrated Pest Management).
- Target education and outreach programs to municipal operations, professional applications, and private consumers.





# Goal 3: Monitor to Show Success

- Demonstrate that diazinon concentrations in urban creeks meet numeric targets
- Demonstrate that urban creek water meets toxicity targets
- Complete studies to ensure that diazinon replacements will meet targets
- Complete studies to foster proactive pesticide regulation and effective education and outreach



# Strategy Includes Specific Actions for Many Parties

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- Water Board
  - U.S. Environmental Protection Agency
  - California Department of Pesticide Regulation
  - Municipal Urban Runoff Management Agencies
  - County Agricultural Commissioners
  - California Department of Consumer Affairs
  - University of California Statewide IPM Program
  - Private Entities
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# Monitoring Will Determine Progress

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- Are diazinon targets met?
  - Are toxicity targets met?
  - If not, is a pesticide the problem or something else?
  - If toxicity is due to a pesticide (other than diazinon), how do toxicity and pesticide concentrations vary throughout watersheds?
  - Are actions sufficient?
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# Urban Runoff Programs Will Lead Monitoring

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- Watershed Characterization
  - Site Selection and Sample Collection
  - Analytical Tests
    - Water column toxicity
    - Sediment toxicity
    - Diazinon concentrations
    - Other pesticides, as necessary
  - Additional Monitoring
    - Support and optimize conventional monitoring
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# Adaptive Management

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- Take immediate actions commensurate with available information
- Review new information as it becomes available
- Modify actions as necessary

**When strategy is in Basin Plan,  
it will be reviewed when Basin Plan is  
reviewed (~ every 3 years).**

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# Many Parties Are Starting to Implement a Solution

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- Water Board is using existing regulatory authorities
    - Water Board coordinates through Urban Pesticide Committee
    - Water Board awarded >\$3 million in grants
  - Others are doing their parts:
    - U.S. EPA
    - California DPR
    - Urban runoff agencies
    - Others
-

# Next Steps

- Project Report comments are due April 12, 2004
- Water Board staff will:
  - respond briefly
  - draft Basin Plan Amendment
  - complete regulatory analyses
- Peer scientists will review Amendment and staff report; staff will respond
- Public will review and comment; staff will respond
- Board Hearing will occur in Fall 2004
- State Board, Office of Administrative Law, and U.S. EPA approvals will follow



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Water Quality Attainment Strategy and  
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**California Environmental Quality Act  
(CEQA) Scoping Meeting**

March 16, 2004



# Basin Plan Amendments Require Environmental Review

- Adopting Basin Plan Amendment will change environment
- Staff Report for Basin Plan Amendment will be “Functionally Equivalent Document”
  - Replaces CEQA document (e.g., Environmental Impact Report)
  - Includes the following analyses:
    - Environmental checklist
    - Alternatives
    - Foreseeable methods of compliance, accounting for a range of factors, including economics

# Some Actions Will Be Considered; Others Will Not

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## Will Consider:

- Direct physical changes in the environment
- Reasonably foreseeable indirect changes

## Will NOT Consider:

- Speculative changes
  - Changes to occur with or without Strategy
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# Analysis Must Consider Potential Adverse Environmental Effects

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- Aesthetics
  - Agricultural Resources
  - Air Quality
  - Biological Resources
  - Cultural Resources
  - Geology / Soils
  - Hazards & Hazardous Materials
  - Hydrology / Water Quality
  - Land Use / Planning
  - Mineral Resources
  - Noise
  - Population / Housing
  - Public Services
  - Recreation
  - Transportation / Traffic
  - Utilities / Service Systems
-

# CEQA Feedback?

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- Physical changes and their adverse effects?
- Alternatives?
- Economic information?

**Comments are due April 12, 2004.**

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